CAR CARE GUIDE

SECTION 10. ENGINE SURGES

"Why Is My Engine Like A Bucking Bronco?"

Surging is another engine-performance problem that has become prominent in recent years. The condition is described as a variation in engine power or a complete loss of power although a steady pressure is being applied on the accelerator.

It differs from the condition described in the last section in that it is not aggravated by increased pressure on the accelerator pedal and may even disappear at wider throttle openings. The car seems to speed up and slow down alternately.

Surging can occur because:

- The EGR valve diaphragm leaks vacuum.
- PCV-valve movement is restricted.
- The vacuum (spark) advance isn't functioning.
- The electronic-ignition pickup is defective.

For information about EGR and PCV, see Section 2. Section 4 explains how to test the vacuum (spark) advance.

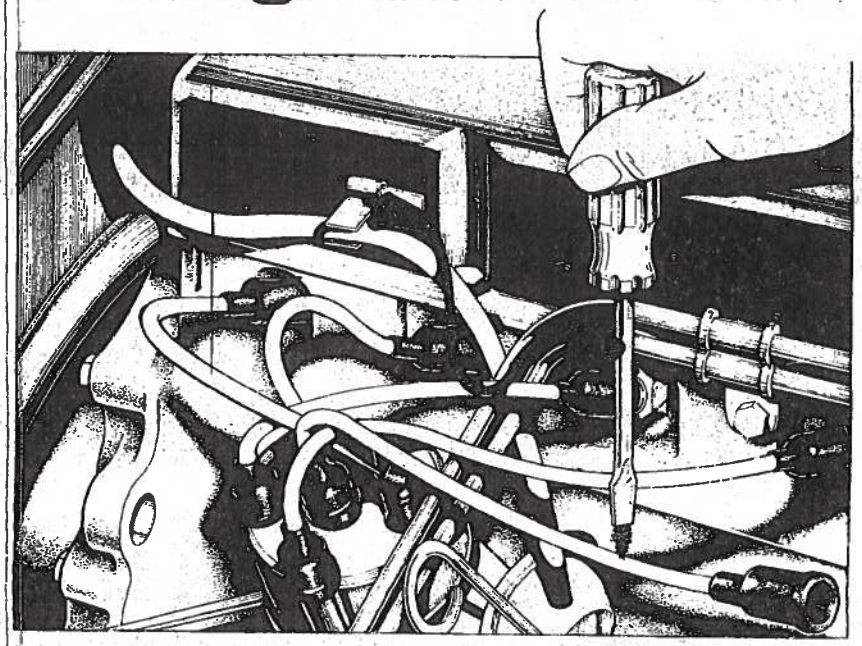
If you examine the preceding list of causes carefully, you'll see that we have actually included two distinctly different types of problems under this heading. The first three are related to fuel mixture. They are all potential sources of vacuum leaks which can lean out the mixture, resulting in misfire. Depending on when and how severely this misfire occurs, the resulting symptom can be interpreted as missing, rough idle or surge.

The last item, electronic-ignition pickup failure, can produce a symptom that is very similar to a lean misfire, because it also results in misfire. However, this misfire is the result of ignition failure, rather than a fuel mixture that is too lean to ignite. While some pickup failures may first make themselves known with a symptom that is better described as a miss, some pickup failures, particularly GM HEI, produce a symptom that is better described as a surge.

In fact, a professional mechanic who operates one of the nation's largest independent repair facilities told us recently that pickup failures are the primary cause of surging in GM cars equipped with HEI ignitions.

Diagnosing pickup failures

Actually, the failures that plague GM HEI pickups are not due to problems in the pickup coil itself; they are the result of broken or partially broken pickup wire leads. These leads are attached to the pickup at the time of manufacture and they connect it to the control module when it is installed in the distributor. The pickup of pre-1982 GM ignitions without electronic spark control is mounted on the distributor's breaker plate. When the vacuum-advance mechanism rotates the breaker plate to provide additional spark advance, the pickup leads must bend. After they've been bent a couple of million times or so, they sometimes break internally. This causes the engine to lose power intermittently, as the advance mechanism moves the breaker plate back and forth. The result is a symptom that can be described as surging.



Test sparkplug cables by grounding a screwdriver to engine with a jumper wire. With cable off plug and engine running, draw screwdriver along the cable and check for sparks.

To check for this condition, you'll need an ohmmeter and a vacuum pump. (Sometimes, however, you can detect a break in a pickup lead merely by examining it.) The test involves checking pickup resistance while moving the breaker plate and can be performed as follows:

1. With the engine shut off, remove the distributor cap and the vacuum-advance hose. Attach a hand vacuum pump to the vacuum-advance port.

2. Disconnect the two pickup leads from the control module and attach them to the two leads of an ohmmeter.

3. Move the breaker plate back and forth by activating the vacuum-advance unit with the hand vacuum pump while watching the ohmmeter. If the ohmmeter indicates infinite resistance at any point, a pickup lead is broken and the pickup will have to be replaced.

To replace the pickup of a GM HEI distributor, the distributor must be removed from the car. Before removing the distributor, mark the position of the rotor and the position of the distributor base in respect to the engine so the ignition timing can be reset easily. Disconnect external distributor leads and remove the distributor hold-down bolt and clamp. Then pull the distributor up and note the new position of the rotor. (It will turn as the distributor is raised.) Mark this position as well. (You will locate the rotor in this position when you reinsert the distributor. Then you'll check to see that it rotates to the other position when reinstalled.)

Once the distributor has been removed, mark the distributor shaft and gear so that they can be reinstalled in the same relative position. Then drive out the roll pin that secures the gear and remove it. Remove the distributor shaft with the rotor and advance weights in place. Then remove the thin "C" washer from on top of the pickup coil. Disconnect the pickup coil leads from the module and remove the pickup coil. Don't remove the three screws.

To install a new pickup, repeat the above procedure in reverse, noting alignment marks

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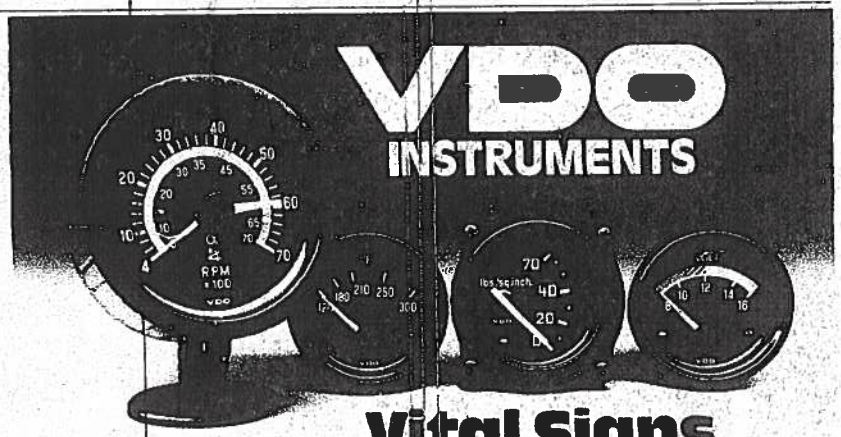

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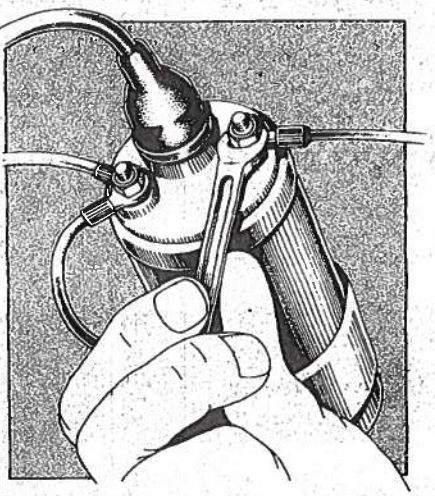
SECTION 10



Check all electrical connections for corrosion and tightness—especially at the coil.

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when reinstalling the gear and when replacing the distributor in the engine.

After the distributor has been reinstalled in the engine and secured, set the initial spark advance according to specifications on the vehicle emissions-control information label. On most GM cars, this important source of tuning specifications is located on the radiator support panel.

Other causes of surging

Surging can also result if one of the following conditions exists:

- Inoperative thermostatic air cleaner or a clogged air-cleaner filter (Section 2).
- Split, kinked or improperly connected vacuum hose (Section 3).
- Leak at the carburetor-manifold junction (Section 2).
- Faulty centrifugal-advance mechanism (Section 4).
- Dirty or damaged carburetor (Section 5).
- Faulty sparkplug wires (Section 5).
- Poor or loose electrical connections (Section 5).

To check for a faulty sparkplug wire, do the following:

1. Disconnect the sparkplug wire at the tip of the sparkplug while the engine is running.

2. Connect a wire from the shaft of a screwdriver to a good engine ground.

3. Run the tip of the screwdriver along the length of every sparkplug wire while watching closely to see if you can spot a spark jumping from the wire to the screwdriver.

If a spark occurs on any of the wires, you should replace them all. If you do need to replace wires, use silicone wire sets. They resist heat and cracking much better than the more conventional fabric- and rubber-insulated wires. **PM**